

and the dentine, while the tubes in the enamel are straight and regular.

In *Dasyuridae* they pass across more sparsely, as is the case also in *Didelphyidae*, and no dilatation takes place at the passage, but there is an abrupt bend at this point.

In *Notoryctes* (fig. 2, p. 411) this marsupial character is very strongly marked; the tubes pass into, and through almost the whole thickness of, the enamel in great abundance: they show no dilatation, but a very strongly marked bending at the point of passage. They have another peculiarity: when in the enamel they often show several sharp abrupt bends, the concavities of which lie towards the grinding surface, but they resume sooner or later their original direction parallel with the enamel prisms.

This character also is met with in *Thylacinus* and markedly in *Didelphys*, but is not to be found in Macropods; hence in this feature of minute structure a point of resemblance with *Didelphys* is shown.

It is interesting to find in these points of minute structure some confirmation of the correctness of the view, arrived at on quite different grounds, that *Notoryctes* has affinities with the *Dasyuridae* and *Didelphyidae*.

### 3. The Blue Bear of Tibet, with Notes on the Members of the *Ursus arctus* Group. By R. LYDEKKER, F.R.S., F.Z.S.

[Received February 17, 1897.]

(Plate XXVII.)

In the year 1853 the late Edward Blyth<sup>1</sup> gave a brief notice of the imperfect skin of a Bear from Tibet, obtained by Dr. A. Campbell, and now preserved in the Indian Museum, Calcutta. He regarded it as probably referable to a variety of the Himalayan Black Bear (*Ursus torquatus*), but suggested that if it proved specifically distinct, the Tibetan Blue Bear, as Dr. Campbell called it, might be known as *U. pruinus*. As Mr. Blanford subsequently pointed out, this title is little more than a *nomen nudum*, and the name apparently dates from the description of a skin and imperfect skull described by the latter writer<sup>2</sup>. These specimens were brought to the late Mr. Mandelli at Darjiling by a native who stated that he had purchased them at Lhasa, and that the animal inhabited the plains around that city. This skin and skull are likewise in the Indian Museum.

Mr. Blanford considered that the skin obtained by Mr. Mandelli was specifically identical with Blyth's Blue Bear of Tibet, and he accordingly described it as a distinct species, under the name of *U. pruinus*; his description being as follows:—

“The general coloration above is tawny brown, palest on the

<sup>1</sup> Journ. Asiat. Soc. Bengal, vol. xxii. p. 589 (1853).

<sup>2</sup> Ibid. vol. xlvii. p. 318 (1877).



J. Smit del et lith

THE BLUE BEAR OF TIBET.  
 $\frac{1}{10}$  nat. size.

Mintern Bros imp



head and shoulders, darker on the back, where the hairs are black with tawny tips, and black on the limbs. The head is tawny, much of the same colour as *Ursus isabellinus*, a little darker and browner under the eyes and on the forehead; the ears have tufts of long hair mixed tawny and black. Behind the head the neck is rather darker, but on the upper part of the breast there is a broad pale tawny crescentic band, with the upper terminations prolonged upwards, in front of the shoulder, almost to the back, precisely as in *U. isabellinus*. . . . . The upper and hinder parts of the shoulder in *U. pruinus* are covered with tawny hairs about  $3\frac{1}{2}$  to 4 inches long, whilst the interscapular region, like the rest of the back, is clothed with black hairs, fulvous at the tips. The hair is moderately fine and about 3 inches long on the back. Apparently the animal when killed was about to lose its long winter coat, for the hair is much felted and matted together in places, and a short fine tawny hair is seen to be growing beneath. The hoary appearance given to the fur by the fulvous tips is extremely characteristic, but it may very possibly be less conspicuous at some seasons.

"The claws are pale in colour, strong and moderately curved, the first (and longest) claw on the fore foot measuring 2.2 inches in a straight line from insertion to tip, and 2.75 round the curve; the corresponding measurements of the first hind claw are 1.3 and 1.4 inches.

"The animal is evidently very old, several of the premolars have been lost and the alveoli obliterated; the molars are much worn. As already mentioned, the size of the teeth, and especially of the molars, is unusually large; the canines appear very little larger than in *U. labiatus*. The posterior molar in the upper jaw is wanting on one side and imperfect on the other, it must be nearly  $1\frac{1}{4}$  inches long and its anterior portion is 0.88 broad; the antepenultimate<sup>1</sup> (first true molar) measures 0.9 inch in length by 0.72. the tooth anterior to this, or hindmost premolar, is 0.62. The three together when perfect must have measured nearly 3 inches in length."

The writer also describes a large skull which he thinks may very probably belong to the same species, but as this identification is not certain, I prefer not to take the specimen into consideration. In a later work<sup>2</sup> Mr. Blanford suggests that *U. pruinus* may not be specifically distinct from *U. arctus*, of which *U. isabellinus* is regarded merely as a local race. Still later Mr. W. L. Sclater<sup>3</sup> considers that *U. pruinus* is not separable from *U. isabellinus*, although the latter is separated from *U. arctus*. He remarks that "in the Eastern Thibetan variety (*U. pruinus*) the hair is blackish or bluish, but it is hardly worthy of separation even as a geographical race."

In the year 1892 the Natural History Museum received a skin

<sup>1</sup> The author obviously means penultimate.

<sup>2</sup> Fauna of Brit. India, Mamm. p. 194 (1888).

<sup>3</sup> Cat. Mamm. Ind. Mus. pt. ii. p. 302 (1891).

and skull of the Blue Bear of Tibet, the former of which is mounted and exhibited in the Mammal Gallery. As this Bear has never been figured, I think the accompanying coloured figure of this specimen (Plate XXVII.) will be acceptable to naturalists, in order that they may see for themselves its very peculiar type of coloration. The skin and skull belong to a sub-adult animal of comparatively small size; the permanent molar dentition, although fully protruded, being practically unworn. The hair on the back and flanks is long, but that on the lower part of the legs shorter; and it seems probable that the animal was killed in winter dress. As regards coloration, the specimen is unlike any other member of the *Ursus arctus* group that has ever come under my notice; the hue of the hair being either white or black, or a mixture of both. Thus on the face and fore part of the body white largely predominates, although in places there are some black hairs, and these are more strongly developed about the forehead, ears, and the fore part of the nape. On the hind nape is a pure white band, or collar, followed by a nearly black transversely elliptical patch above the shoulder-blades. Over the rest of the body the hair is mingled black and white, so as to present a bluish tinge; and the hind limbs are similar, although the lower parts of the fore legs are almost black. The claws are whitish.

As regards the skull, the large size of the last lower premolar, which is such a characteristic tooth in the genus, clearly indicates that this Bear is a member of the *U. arctus* group. Nothing very distinctive appears in the other teeth, although the last lower molar has the elongation generally found in the Himalayan Brown Bear. The cusps of all the cheek-teeth are relatively tall, but not, I think, more so than in some specimens of other members of the group. The upper carnassial is also proportionately large, but some examples of the Himalayan form come very close in this particular. The skull has a nearly straight profile, and in this respect differs very remarkably from crania of the same age of the Himalayan Brown Bear, in which there is a very sudden rise at the front border of the orbits, with a median depression at the root of the nasals.

The difference in the coloration of the skin from that of the specimen described by Mr. Blanford is so great, that I have no hesitation in regarding the British Museum example as belonging to a distinct form, this being Blyth's *Ursus pruinosus*. And I may add that Mr. Blanford agrees with me on this point, and considers that the skin he described under that name belongs to a large brown or grizzly Bear,—perhaps *U. arctus isabellinus* or *U. arctus collaris*. I have never seen a Himalayan Bear with any approach to the coloration of the specimen now described, and, taking also into consideration the characters of the skull, it seems to me that the Tibetan Blue Bear differs more from the typical *U. arctus* than does any other Old World member of the group. With regard to the proper name for this form, I am in some difficulty, seeing that *U. pruinosus*, Blanford, belongs to another form. I find, however, in



the Catalogue of the Zoological Collections of H. M. Prejevalsky, p. 9 (St. Petersburg, 1887), reference to a Tibetan Bear under the name of *U. lagomyarius*, which is probably the present form. And, if this name has been properly published, it will probably stand for the species, if the term *pruinus* is to be superseded.

A very noticeable feature in the British Museum skin is the curious approximation which it makes to the type of coloration distinctive of *Æluropus melanoleucus* of the same region. This is especially shown by the pure white band on the hind nape, followed by the black interscapular patch; and less markedly by the tendency to blackness on the ears and forehead. Is it too much to consider that this type of coloration has been produced in both animals by similar environment? I think not. Of what advantage to its owner may be the peculiar coloration of *Æluropus* has never been determined. It may be suggested that in a forest country where snow lies deep in the winter, the black shoulder-stripe and limbs with the white of the rest of the body would be very inconspicuous among dark tree-stems; but such an explanation affords no clue to the advantage of this very remarkable type of coloration in summer, when we may presume snow would have disappeared from the forests. Moreover, it is not certain that both forms do not dwell above the forest level.

I now come to the very difficult question whether the brown and greyish Bears of the Northern Hemisphere form more than one species. Very different views are held on this subject by different writers, and as the literature is extensive, I shall not attempt to give a summary of what has been written. A few examples of different views may, however, be advantageously cited. Middendorff<sup>1</sup>, in a long essay on the subject, came to the conclusion that all the Bears of the *U. arctus* group in both the Eastern and Western Hemisphere were merely varieties of but one species. On the other hand, Gray<sup>2</sup> not only split them up into a number of species, but actually separated some of them generically. Perhaps the most remarkable feature in his work is the separation of a Brown Bear from Norway, as *Myrmarcos eversmanni*<sup>3</sup>, from the Brown Bear of Sweden, which is regarded as referable to the typical *U. arctus*. Moreover, he identifies one of the Kamschatkan skulls described by Middendorff as *U. arctus* var. *beringiana* with the former, whereas the other is regarded as referable to a sub-species (*collaris*) of *U. arctus*.

In 1877, the late Mr. George Busk<sup>4</sup> referred all the living Old World Brown Bears to varieties of *U. arctus*. An important statement in this paper regarding the fossil Pleistocene Brown Bear of Europe (*U. fossilis* of Goldfuss) runs as follows:—"This form has appeared to me to coincide so very closely with the existing *U. ferax* or *horribilis* of North America, that I was induced some years

<sup>1</sup> Sibir. Reise (1851).

<sup>2</sup> See Cat. Carniv. Brit. Mus. (1869).

<sup>3</sup> This is founded on a young skeleton in the Museum.

<sup>4</sup> Trans. Zool. Soc. vol. x. p. 53 et seq.

since to suggest that they might be regarded as specifically the same, so far as dental and cranial characters are concerned." Later on in the same paper it is stated, in reference to remains of a Bear from the Gibraltar bone-caverns, "that the preponderance of its characters is in favour of its being closely related to *U. fossilis* sive *priscus*, or to a form intermediate between that and *U. arctos* var. *isabellinus*." Although I confess to great difficulty in distinguishing between the teeth of Old World and American Brown Bears, I think it will be admitted that, if we trust Mr. Busk's conclusions, the Pleistocene Brown Bear of Europe must have been the common ancestor of the existing Brown Bears of both the Eastern and Western Hemispheres.

Passing over certain other writers, I have next to mention that in 1881 Fitzinger<sup>1</sup>, if I understand him rightly, came to the conclusion that most of the so-called species of Brown Bears described from Europe and Asia were mere colour-phases or other varieties of *U. arctus*. He, however, recognized the so-called "halsband" Bear—the *U. collaris* of F. Cuvier—as a distinct species, inhabiting Kamschatka and Siberia. And he regarded the "golden" or "silver" Bear of Europe as a subspecies, under the name of *U. arctus aureus*; considering *U. formicarius* of Eversmann (= *U. longirostris*, Schinz, and *Myrmarcos eversmanni*, Gray) as inseparable from this variety.

Eight years later Dr. E. Schärff<sup>2</sup>, in a paper on the skull-variation of *U. arctus*, came to the conclusion that *Myrmarcos eversmanni* is only a variety of the former species, with which he also identified *U. syriacus*, *U. isabellinus*, and *U. piscator*. With regard to *U. syriacus* and *U. isabellinus*, the same view is held by Mr. Blanford<sup>3</sup>, but Mr. W. L. Sclater<sup>4</sup> regards them as together forming a distinct species, and uses the latter name.

This will suffice for the Old World Brown Bears, and I have now to quote two papers referring to those of the New World, in which totally opposite views are expressed. In the first of these, Mr. A. E. Brown<sup>5</sup> considers that *U. americanus*, *U. cinnameus*, *U. luteolus*, and *U. horribilis* are nothing more than varieties of *U. arctus*, the first and second being more distinct than is the last. On the other hand, Dr. C. H. Merriam<sup>6</sup>, comes to the conclusion that not only are all the North-American Bears (exclusive of the Polar Bear) distinct from those of the Old World, but that the Black Bears, of which four forms are recognized, should be separated subgenerically from the members of the *U. arctus* group. Of the latter no less than five species and one or two subspecies are recognized as inhabiting the North American continent. From the structure of the lower carnassial tooth, Dr. Merriam seems to have made out pretty clearly

<sup>1</sup> SB. Ak. Wien, vol. lxxxiv. pp. 1-22 (1881).

<sup>2</sup> Archiv f. Nat. 1889, vol. i. pp. 244-267.

<sup>3</sup> Fauna of Brit. India, Mamm. p. 194 (1888).

<sup>4</sup> Cat. Mamm. Ind. Mus. pt. ii. p. 302 (1891).

<sup>5</sup> Proc. Ac. Philadelphia, 1894, pp. 119-129.

<sup>6</sup> Proc. Biol. Soc. Washington, vol. x. pp. 65-83 (1896).

that the Black Bear (whether one or more forms are recognized is immaterial) is decidedly different from all the members of the *U. arctus* group.

The feature which strikes me as the most remarkable in his paper is the recognition of three distinct species of the Brown Bear group as inhabiting Alaska alone—one being from Kadiak Island, the second from Yakutat Bay, and the third from the coast near Sitka. Now when we take into consideration the large size of these animals and the circumstance that Carnivora are generally in the habit of wandering over wide tracts of country, it appears to me impossible to have three distinct species inhabiting such a limited area, although there may be grounds for regarding the island form as separable from those inhabiting the mainland. In the separation of the American Bears, Dr. Merriam relies very largely on differences in the skull and cheek-teeth; but it appears to me that too much importance has been attached to such points of difference both by himself and Gray. A remarkable instance of this is afforded by the case of the so-called *Myrmarcos evermanni*, to which Gray refers one of the skulls figured by Middendorff as *U. arctos*, var. *beringiana*; this skull coming from Kamschatka, where the typical form of that Bear dwells. And to believe that there are two closely allied Bears in Kamschatka seems to me an absolute impossibility. I cannot help agreeing with Dr. Schärff that when we find Bear-skulls from the same district showing considerable differences from one another, we must attribute such differences either to individual or sexual variation, or to age<sup>1</sup>. Similarly, we may find among the Bears of Europe some individuals with long limbs, high foreheads, and elongated muzzles, whereas in others from the same district the limbs are shorter and stouter, the forehead broader and flatter, and the muzzle shorter. And surely such differences cannot be regarded as of specific, or even subspecific, value. On the other hand, when all the Bears of one particular district differ in one or more characters from those inhabiting the neighbouring regions, specific or subspecific differences may fairly be claimed.

Admitting, then, that there are certain differences to be found among the members of the *U. arctus* group inhabiting different areas, the next question is whether these should be regarded as of specific or subspecific value. It may fairly be allowed that the question is not of very much importance one way or the other, and also that it is one in which scarcely any two observers are likely to agree. All are, however, I believe in accord as to the close alliance between the Bears of this group. And an important point to my mind—though it is one which others will probably deem worthy of little consideration—is that the Pleistocene Brown Bear of Europe, according to Busk, is nearer to the American Grizzly than to the typical existing Brown Bear. If this be true, it points to the

<sup>1</sup> In the case of the type of *Myrmarcos evermanni* the difference is due to immaturity alone.



conclusion that all the living forms have been differentiated from one another at a very recent epoch indeed, and probably in the Old World. On the whole, then, I am inclined to regard the various members of the group, with the exception of the Tibetan Blue Bear, as subspecies rather than species<sup>1</sup>. It is true that in some of the North American Bears the front claws are longer and straighter than in their Old World relatives, but this character does not serve to separate all the American forms as a species apart from all the latter. Neither, if I unite the Old World Bears, can I admit the right of all the American forms to stand as distinct species. I take this opportunity of mentioning that I am inclined to regard many mammals having representative forms in the two hemispheres as subspecies. This, I think, is the case with the Foxes, the Wolves, and the Weasels; while the Asiatic Wapitis (*Cervus eustephanus* and the allied *C. luehdorfi*) are probably only races of the American *C. canadensis*. And I also think that the host of species recently made in North America out of the form which used to be known as *Tamias asiaticus* will come under the same category. I am fully aware that in this view I shall be running atilt at all the modern school of American zoologists; but I have, at least to some extent, on my side men like Messrs. Blanford and Mivart, to whose opinions I attach the very highest value. And I also side with Huxley that it is a far less important error to overlook differences than not to see resemblances.

In the following list I have endeavoured to arrange the Bears of the *Ursus arctus* group according to my ideas of what their classification should be. I have not attempted to give the whole synonymy, as in several cases I am at loss where to place synonyms.

#### 1. *URSUS ARCTUS*.—*Brown Bear*.

*Ursus arctos*, Linn. Syst. Nat. ed. 12, vol. i. p. 69 (1766).

*Ursus arctus*, Blanford, Fauna Brit. Ind., Mamm. p. 194 (1888).

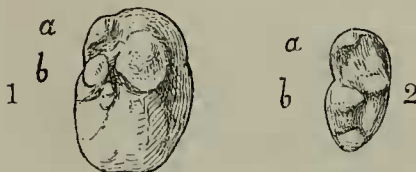
Under this name I include all the brown, greyish, and grizzled existing Bears. In all these the cheek-teeth are large, the inner tubercle of the upper carnassial is large, the last lower molar has a large talon, and there is a considerable interval between the fourth lower premolar and the canine, in which are situated the three anterior premolars in young individuals. The first lower premolar is very small, and the fourth large and generally furnished with two small tubercles on the inner side, one in advance of and the other behind the main cusp. The lower carnassial is also a large and complex tooth, generally with accessory cusps on the inner border of its talon.

With regard to the two inner tubercles on the fourth lower premolar, a few words are necessary. As is well known to palæont-

<sup>1</sup> If they are regarded as species, *Ursus* ought to be split up into several genera.

ologists, in *Ursus spelæus* (fig. 1) this tooth is short and has two very large tubercles. Busk<sup>1</sup> considered that only one of these tubercles (the posterior) is represented in the corresponding tooth of the typical *U. arctus* group, and apparently regarded the anterior tubercle as distinct. I cannot, however, but consider them as homologous, and I think Busk has attached far too much importance to them, as also to the structure of the talon in the same tooth.

Fig. 1.



Fourth right lower premolars of *Ursus spelæus* (1) and *U. arctus isabellinus* (2).  
a, anterior; b, posterior tubercle.

### 1. *URSUS ARCTUS FOSSILIS*.—*Pleistocene Brown Bear*.

*Ursus fossilis*, Goldfuss, Nova Acta Ac. Cæs. Leop.-Car. vol. x. pt. 2, p. 259 (1821): Busk, Trans. Zool. Soc. vol. x. p. 64 (1877).

*Ursus priscus*, Cuvier, Ossements Fossiles, vol. iv. p. 380 (1823).

*Ursus ferox fossilis*, Busk, Phil. Trans. 1873, p. 546.

According to Busk, the Brown Bear of the English caverns and Irish peat-bogs is much nearer to the Grizzly than to the European Brown Bear, which first makes its appearance in the English fen-deposits. In this determination he relies chiefly on the characters of the skull and the large size and structure of the fourth lower premolar. Although, as I shall show presently, one of the characters of the latter tooth on which he lays stress is not constant, yet I feel bound to accept the general conclusions of one who has devoted so much labour to a very difficult subject. It is important to notice that he regards the Brown Bear from the Gibraltar caverns as probably intermediate between *U. arctus fossilis* and *U. arctus isabellinus*.

As already said, if his conclusions are correct we must regard *U. arctus fossilis* as the ancestral stock from which have sprung all the other members of the group.

### 2. *URSUS ARCTUS TYPICUS*.—*European Brown Bear*.

*Ursus pyrenaicus*, F. Cuv. Hist. Nat. Mamm. livr. xlv. (1824).

*Ursus norvegicus*, F. Cuv. *op. cit.* livr. vii.

*Ursus cadavarinus*, Eversmann, Bull. Soc. Moscon, 1840, p. 8.

*Ursus formicarius*, Eversmann, *loc. cit.*

*Myrmarcos eversmanni*, Gray, Proc. Zool. Soc. 1864, p. 695; Cat. Carniv. Brit. Mus. p. 232 (1869).

Under this name may be included the living Bears of Europe at

<sup>1</sup> Trans. Zool. Soc. vol. x. pp. 65, 66 (1877)

least as far east as the Caucasus and Urals. Although variable in this respect, this form is not excessively large, and the colour is typically dark brown; while the skull has a comparatively regular and low profile and a wide palate. According to Busk, the fourth lower premolar is relatively small, without trace of the posterior inner tubercle. I find, however, that in a young skeleton from Russia, in the British Museum, this tubercle is very well developed, while there are slight traces of it in a skull from Norway (B.M. no. 62.3.29.8). The front claws are short and curved.

3. *URSUS ARCTUS SYRIACUS*.—*Syrian Brown Bear*.

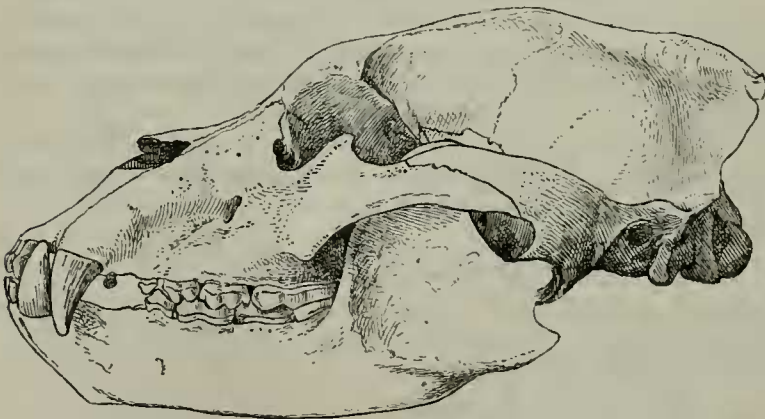
*Ursus syriacus*, Hempr. & Ehrenb., Symb. Phys. vol. i. pl. i. (1828); Gray, Cat. Carniv. Brit. Mus. p. 224 (1869); Fitzinger, SB. Ak. Wien, vol. lxxxiv. p. 14 (1881).

This form, which inhabits Syria and Palestine, has been very generally identified with the next<sup>1</sup>, and I am not prepared to say that this may not be correct. Among the few skins that have come under my notice, I have, however, seen none presenting the creamy tint characteristic of immature examples of the Kashmir form. In the one skull I have seen the profile lacks the deep concavity characteristic of the Kashmir Brown Bear. In the last lower premolar there is a slight trace of the posterior inner tubercle.

4. *URSUS ARCTUS ISABELLINUS*.—*Kashmir Brown Bear*.

*Ursus isabellinus*, Horsfield, Trans. Linn. Soc. vol. xv. p. 332 (1826); W. L. Sclater, Cat. Mamm. Ind. Mus. pt. ii. p. 302 (1891).

Fig. 2.



Profile view of sub-adult skull of *Ursus arctus isabellinus*.

The Bear which inhabits the middle Himalaya, extending from

<sup>1</sup> See Fitzinger, *loc. cit.*

Afghanistan to Nepal, appears to be generally smaller than the European Brown Bear, but is specially characterized by the light creamy-brown tint of the winter pelage. Very old males, which grow to a large size, are, however, considerably darker. The skull (fig. 2, p. 420) is characterized by the obtuse angle formed in the profile at the anterior border of the orbits, and the median hollow where the nasals join the frontals. The fourth lower premolar (fig. 1, p. 419) is relatively long and narrow, with both the anterior and posterior inner tubercles well developed.

5. *URSUS ARCTUS COLLARIS*.—*Kamschatkan Brown Bear*.

*Ursus collaris*, F. Cuvier, Hist. Nat. Mamm. livr. xliii. (1824); Fitzinger, SB. Akad. Wien, vol. lxxxiv. p. 16 (1881).

*Ursus arctos*, var. *Beringiana*, Middendorff, Sibir. Reise, vol. i. pt. ii, taf. i. (1851).

*Ursus piscator*, Pucheran, Rev. Zool. 1855, p. 392; Selater, Proc. Zool. Soc. 1867, p. 817.

*Ursus lasiotus*, Gray, Ann. Mag. Nat. Hist. ser. 3, vol. xx. p. 301 (1867); Cat. Carniv. Brit. Mus. p. 223 (1869).

*Ursus beringiana*, Merriam, Proc. Biol. Soc. Washington, x. p. 69 (1896).

The typical *U. collaris* of F. Cuvier is from Siberia, but there can be no reasonable doubt of its identity with the *U. arctos* var. *beringiana* of Middendorff (= *U. piscator* and *U. lasiotus*). Busk<sup>1</sup>, who regarded all the North American members of the group as referable to a single species, identified *U. piscator* therewith. Fitzinger<sup>2</sup> gives the range as extending from the Ural through the whole of Siberia to Kamschatka. It is one of the largest of all living land Bears, old specimens probably attaining a length of fully nine feet. Fitzinger's description is as follows:—The hinder part of the head is broad and long, with convex parietals, and a flattened forehead, passing gradually into a long, thick, and abruptly truncated snout. Compared with the common Brown Bear, the ears are shorter and more rounded, the body is thick and massive, and the hair long and tangled. The colour varies from light yellowish-brown to blackish-brown, a broad whitish gorget extends from the throat to the shoulders, and the legs are black. The hair on the flanks darkens with age. He adds that this Bear is undoubtedly distinct from the common Brown Bear of Europe, and that it is abundant in Kamschatka.

According to Gray the light collar is not constant.

There are several skulls of this form in the British Museum. In a sub-adult specimen the vaulting of the frontal region is moderately developed. In a very old one there is a distinct concavity at the root of the nasals, and the zygomatic width is not excessive. The fourth lower premolar has only the posterior inner tubercle developed. I do not know the form and length of the claws.

<sup>1</sup> Trans. Zool. Soc. vol. x. p. 64 (1877).

<sup>2</sup> SB. Ak. Wien, vol. lxxxiv. p. 16 (1881).



6. *URSUS ARCTUS MIDDENDORFFI*.—*Kadiak Brown Bear*.

*Ursus middendorffi*, Merriam, Proc. Biol. Soc. Washington, vol. x. p. 69 (1896).

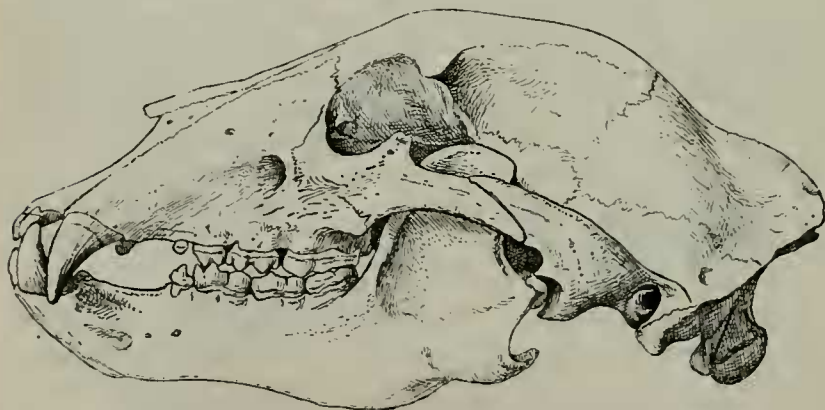
Although closely allied to the preceding, which it somewhat exceeds in size, and thus the largest living member of the group, the Bear of Kadiak Island, Alaska, is, I consider, rightly separated by Dr. Merriam. I have not seen a skull, but it appears, from his figures and description, that in adult males the frontal region is enormously elevated, highly arched, and relatively narrow; the zygomatic arches enormously wide, and the postzygomatic region very short. There appears to be no concavity at the root of the nasals; and the great elevation of the frontal region seems most conspicuous in sub-adult examples. Merriam gives a number of minor characters distinguishing the skulls of the two forms, which need not be recapitulated here. It is stated that in the adult female the skull is relatively more elongated and the frontal region less elevated than in the male. The front claws are long and considerably curved.

I presume that Dr. Merriam had definite knowledge of the sex of the skulls of the Kamschatkan Bear with which he makes comparison. Those in the British Museum are not determined, and if they be females a question might arise whether this form is really distinct from the preceding. The characters of the fourth lower premolar are not given.

7. *URSUS ARCTUS YESOENSIS*, subsp. nov.—*Yezo Brown Bear*.

My attention has been directed by Mr. Thomas to three skulls from Yezo, the northern island of Japan, in the British Museum, which differ so remarkably from any others I have seen as to

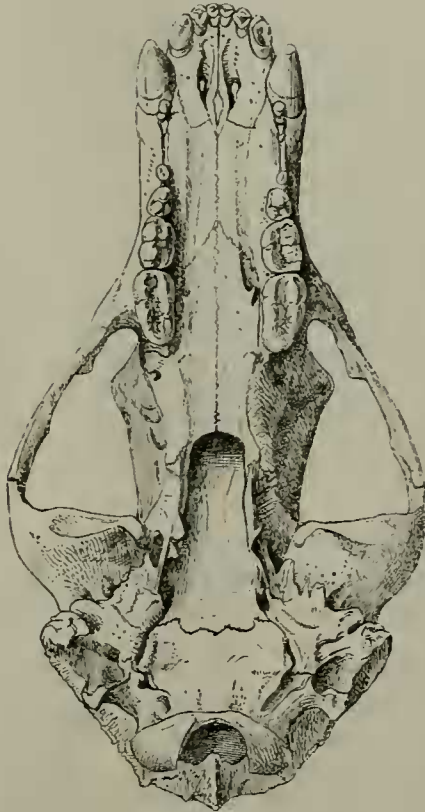
Fig. 3.

Profile view of sub-adult skull of *Ursus arctus yesoensis*.

indicate a distinct form. They comprise a half-grown, a sub-adult (no. 86.11.18.2), and a fully adult specimen (no. 96.4.27.1). Compared with skulls of similar age of the Kamschatkan form, which

they approach in size, these specimens differ very remarkably. Taking the half-grown and sub-adult specimens (the latter of which is here figured, figs. 3 & 4), it will be found that the profile forms a continuous convex arch, almost like that of *U. torquatus*, although the skull is much longer than in the latter. The difference is also observable in the fully adult specimen, in which there is no trace of the concavity at the root of the nasals so conspicuous in the Kamschatkan Bear. The palate (fig. 4) is also peculiar on account of its extreme elongation and narrowness, the pterygoid fossa being narrower and not extending so far forwards. The pterygoids themselves are also very different bones, being much larger and of a distinctly oblong form. The premaxillæ, too,

Fig. 4.



Palatal aspect of skull of *Ursus arctus yesoensis*.

extend farther back on the palate, reaching behind the alveolus of the canine, instead of stopping short near the middle line of that tooth. The fourth lower premolar is very short, with scarcely any inner tubercles, the hinder of which is well marked in the Kamschatkan Bear. So far as I can see, these peculiarities are constant in all three skulls.

Compared with Dr. Merriam's figure of the sub-adult skull of the

Kadiak Bear, the British Museum specimen appears larger, with less expansion of the zygomata, and the arching not so high or so sudden, but more regular.

This Bear is doubtless the *Ursus ferox* of Temminck's 'Fauna Japonica,' which was from the north island of Japan. *Ursus japonicus*, on the other hand, probably comes from the southern island, of which the fauna, Mr. Thomas tells me, is of an Oriental type, whereas that of Yezo is strictly Holarctic.

8. *URSUS ARCTUS DALLI*.—*Alaskan Brown Bear*.

*Ursus dalli*, Merriam, Proc. Biol. Soc. Washington, vol. x. p. 71 (1896).

*Ursus sitkensis*, Merriam, *op. cit.* p. 73.

This Bear, although very large, is slightly inferior in size to the one inhabiting Kadiak Island, and has the frontal region of the skull but slightly elevated and nearly flat. In the typical form, from Yakutat Bay, the upper carnassial is unusually large, with an additional internal tubercle, the lower carnassial has accessory tubercles on the inner side of the talon, and the fourth lower premolar has a well-developed postero-internal cusp. On the other hand, in the rather smaller form from Sitka the upper carnassial is normal (tricuspid), the lower carnassial has no accessory tubercles on the inner side of the talon, and the fourth premolar (if I understand the description rightly) has only the antero-internal cusp. Even if such differences prove constant (which I doubt), I should not be disposed to regard even them as of subspecific value, considering that both Bears come from districts so close to one another as are Yakutat Bay and Sitka. The front claws, as exemplified by a specimen in the British Museum, are long and much curved.

9. *URSUS ARCTUS HORRIBILIS*.—*Grizzly Bear*.

*Ursus horribilis*, Ord, in Guthrie's Geography, 2nd Amer. ed. vol. i. p. 291 (1815); Merriam, Proc. Biol. Soc. Washington, vol. x. p. 74 (1896).

*Ursus cinereus*, Desmarest, Mammalogie, vol. i. p. 164 (1820).

*Ursus ferox*, Desmarest (? *ex* Lewis & Clarke), *loc. cit.*

*Ursus (Danis) cinereus*, Gray, Cat. Carniv. Brit. Mus. p. 228 (1869).

The true Grizzly Bear, ranging from Norton Sound, Alaska, through the northern Rocky Mountains to Utah, is a smaller animal than either of the preceding forms. According to Busk, this Bear (probably in common with some of the preceding New World types) differs from *U. arctus typicus* in the following points:—The jugal arcade is less of a circle and more of an ellipse; the palate is flatter; the last upper molar is less narrowed behind; the inner tubercle of the upper carnassial is larger; and the fourth lower premolar is larger, and usually has two internal tubercles<sup>1</sup>.

<sup>1</sup> As already mentioned, the second of these tubercles may be present in *U. a. typicus*, and both are constant in *U. a. isabellinus*.